In re Patent Application of:
MEARS
Serial No. **NOT YET ASSIGNED**
Filed: **HEREWITH**
Attorney Docket: **62603_CON1**

IN THE CLAIMS:

Please cancel Claims 1 to 76.

Please add new Claims 77 to 104.

77. (new) A method for making a semiconductor device comprising:

forming a superlattice comprising a plurality of stacked groups of layers; and

each group of layers of the superlattice comprising a plurality of stacked base semiconductor monolayers defining a base semiconductor portion and an energy band-modifying layer thereon;

the groups of layers arranged in an alternating pattern of first and second groups of layers, with each first group of layers comprising three base semiconductor monolayers, and each second group of layers comprising five base semiconductor monolayers;

the energy-band modifying layer comprising at least one non-semiconductor monolayer constrained within a crystal lattice of adjacent base semiconductor portions.

78. (new) A method according to Claim 77 wherein the superlattice also has a common energy band structure therein.

79. (new) A method according to Claim 77 wherein the superlattice has a higher charge carrier mobility in at

least one direction than would otherwise be present.

80. (new) A method according to Claim 79 wherein the higher charge carrier mobility results from a lower conductivity effective mass for the charge carriers in a parallel direction than would otherwise be present.

81. (new) A method according to Claim 80 wherein the lower conductivity effective mass is less than two-thirds the conductivity effective mass that would otherwise occur.

82. (new) A method according to Claim 79 wherein the charge carriers having the higher mobility comprise at least one of electrons and holes.

83. (new) A method according to Claim 77 wherein each base semiconductor portion comprises silicon.

84. (new) A method according to Claim 77 wherein each energy band-modifying layer comprises oxygen.

85. (new) A method according to Claim 77 wherein each energy band-modifying layer is a single monolayer thick.

86. (new) A method according to Claim 77 wherein the superlattice further has a substantially direct energy bandgap.

87. (new) A method according to Claim 77 wherein

the superlattice further comprises a base semiconductor cap layer on an uppermost group of layers.

88. (new) A method according to Claim 77 wherein each non-semiconductor monolayer is thermally stable through deposition of a next layer.

89. (new) A method according to Claim 77 wherein each base semiconductor portion comprises a base semiconductor selected from the group consisting of Group IV semiconductors, Group III-V semiconductors, and Group II-VI semiconductors.

90. (new) A method according to Claim 77 wherein each energy band-modifying layer comprises a non-semiconductor selected from the group consisting of oxygen, nitrogen, fluorine, and carbon-oxygen.

91. (new) A method according to Claim 77 wherein forming the superlattice comprises forming the superlattice on a substrate.

92. (new) A method according to Claim 77 further comprising doping the superlattice with at least one type of conductivity dopant therein.

93. (new) A method according to Claim 77 wherein the superlattice defines a channel for a transistor.

94. (new) A method for making a semiconductor

device comprising:

forming a superlattice comprising a plurality of stacked groups of layers; and

each group of layers of the superlattice comprising a plurality of stacked silicon atomic layers defining a silicon portion and an energy band-modifying layer thereon;

the groups of layers arranged in an alternating pattern of first and second groups of layers, with each first group of layers comprising three base silicon monolayers, and each second group of layers comprising five base silicon monolayers;

the energy-band modifying layer comprising at least one oxygen atomic layer constrained within a crystal lattice of adjacent silicon portions.

95. (new) A method according to Claim 94 wherein the superlattice has a common energy band structure therein.

96. (new) A method according to Claim 94 wherein the superlattice has a higher charge carrier mobility in at least one direction than would otherwise be present.

97. (new) A method according to Claim 96 wherein the higher charge carrier mobility results from a lower conductivity effective mass for the charge carriers in a parallel direction than would otherwise be present.

98. (new) A method according to Claim 96 wherein the charge carriers having the higher mobility comprise at

least one of electrons and holes.

99. (new) A method according to Claim 94 wherein each energy band-modifying layer is a single atomic layer thick.

100. (new) A method according to Claim 94 wherein the superlattice further has a substantially direct energy bandgap.

101. (new) A method according to Claim 94 wherein the superlattice further comprises a silicon cap layer on an uppermost group of layers.

102. (new) A method according to Claim 94 wherein forming the superlattice comprises forming the superlattice on a substrate.

103. (new) A method according to Claim 94 further comprising doping the superlattice with at least one type of conductivity dopant therein.

104. (new) A method according to Claim 94 wherein the superlattice defines a channel for a transistor.